

*Prepared for:*  
**SOULARD Second Street, LLC**

# **SOIL MANAGEMENT PLAN**

**Soulard Industrial Development  
201 Russell Boulevard  
St. Louis, MO**

*Submitted by*

**Geosyntec**   
consultants

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St. Louis, Missouri**

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## SECTION 1

### SOIL MANAGEMENT PLAN

This Soil Management Plan will be implemented for the initial development of the proposed industrial warehouse and shall be utilized for any subsequent excavation work. The plan, prepared by Geosyntec Consultants (Geosyntec) for Soulard Second Street, LLC (SSS), is intended to protect all workers and contractors conducting excavations and related activities and to serve as an institutional control requiring such protection as part of the Soulard Industrial Development Property, located at 201 Russell Boulevard, St. Louis, Missouri (the “Site”) as described in United States Environmental Protection Agency’s (USEPA) Environmental Covenant for the John F. Queeny Plant (Site) (USEPA, 2018A; **Figure 1**). The 8.3-acre area of the Site is roughly bounded by the former location of Lesperance Street to the north, South 2nd Street to the west, South Trudeau Street to the south, and DeKalb Street to the east. The Site is currently being considered for redevelopment by constructing an approximate 155,000 square foot slab-on-grade distribution warehouse with accompanying loading docks and vehicle parking spaces. The plan also provides guidance for management of excavated soil, including soil characterization, transportation, and disposal.

#### 1.1 **Background**

Certain elements of this section of the Soil Management Plan (i.e., Plan) are based on the current understanding of the proposed building at the Site, as well as the type of occupancy (warehouse work) of the proposed building. This section of the Plan should be updated if changes to the Building construction or occupancy occur subsequent to the date of this Plan.

#### 1.2 **Objectives**

Soil underlying portions of the Soulard Industrial Development contains chemicals of interest (COIs) at concentrations that may require (i) implementation of supplemental safety procedures to protect workers performing excavation and related activities and (ii) specific soil management activities. The soil impacts are legacy impacts of the John F. Queeny Plant, as described in Section 1.3.

The objective of this Plan is to establish:

- A Site facility contact for notification and planning of excavation activities;
- Areas of the Site facility that require additional safety and soil management procedures;
- Potential COIs that may be present in the soil, foundation materials, or debris;
- Excavation safety procedures associated with soil, foundation materials, or debris potentially impacted by COIs; and

- Soil, foundation materials, and debris management procedures.

### 1.3 Contaminants of Concern

From the time that manufacturing operations began at the site, the J. F. Queeny Plant manufactured over 200 products using over 800 raw materials. The major products have included, but are not limited to, the following: process chemicals such as maleic anhydride, fumaric acid, toluene, sulfonic acid, and plasticizers such as phthalate esters and toluene sulfonamides; synthetic functional fluids such as Pydrauls, Skydrols, and coolanols; food and fine chemicals such as salicylic acid, aspirin, methyl salicylate, benzoic acid, and ethavan; and agricultural chemicals such as Lasso (i.e., acetanilides or alachlor). As a result of numerous facility investigations over the last four decades, four primary areas of concern associated with chemical releases to the environment were identified (USEPA, 2018B). Two of the four primary areas are within the footprint of the Site.

A Human Health Risk Assessment (HHRA) was prepared for this facility in 2015. That HHRA considered prior property use, potential future property use, and the data generated from prior groundwater sampling events as the rationale for conducting an updated, focused HHRA. No ecological risk assessment was prepared for this facility due to a lack of suitable habitat for potential ecological receptors. Estimates of cancer risk were expressed as the probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogenic contaminant. Remediation was considered to be required if the estimated cancer risk from cumulative exposure to facility-related contaminants was greater than 1 excess cancer case out of 10,000 people (referred to as a  $1 \times 10^{-4}$  risk). Remediation was not considered to be necessary if the cumulative cancer risk was less than 1 excess cancer case in 1,000,000 people (referred to as the de minimis risk level or a  $1 \times 10^{-6}$  risk). Estimated cumulative cancer risks that fall between  $1 \times 10^{-4}$  and  $1 \times 10^{-6}$  were said to be within the “target risk range,” and the need for remediation was to be determined on a case-by-case basis.

In general, estimates of health risks from contaminant toxicity are developed for those contaminants that are not carcinogens and for the non-carcinogenic health effects of carcinogens. This estimate is called a “hazard index” and is the ratio of estimated daily intake of a contaminant to a reference dose that has no observed health effects. A hazard index of 1 (or less than 1) for individual chemicals and a cumulative “hazard quotient” of 1 (or less than 1) for combinations of chemicals is generally considered to be safe.

Based on previous studies of this site, two areas of concern have been identified, which are further described below and are referenced on **Figure 2**.

- **FF Building Area:** The area associated with the FF Building includes the footprint of the former building (an area of approximately 150 feet by 75 feet) and the surrounding area, including a former underground storage tank. The ground covering in this area is asphalt and crushed and compacted stone. This area is currently not in use, and no buildings are located in the area. Soil and groundwater are contaminated with multiple volatile organic

compounds; benzene, chlorobenzene, ethylbenzene, tetrachloroethene, toluene, trichloroethene, vinyl chloride, and xylene (total). Based on the HHRA as earlier described, the FF Building Area has an Industrial/Commercial hazard quotient of 29 and 1.5 for construction worker.

- **VV Building Area:** The VV Building Area structure served as the production area known as “Central Drumming.” Activities at this location involved the unloading and bulk storage of a wide variety of liquid materials and the repackaging of these materials or a blend of these materials into smaller quantities (i.e., quarts, gallons, and 5-gallon containers). The VV Building Area included a railcar unloading area where PCB formulations were unloaded and pumped into storage prior to repackaging for shipment. This area is primarily paved, with some of the area being covered with gravel and a rail spur. Extensive removal of soil contaminated with PCBs has previously been performed at the VV Building Area. PCBs remain in soil at concentrations below 100 milligrams per kilogram at the VV Building Area, and future site use restrictions included in the Environmental Covenant are proposed as a component of the final remedy for this area. The former VV Building location is included in the area to be covered by the PCB engineering barrier.

#### **1.4 Site Contacts and Notification**

Prior to excavating soil, foundation materials, or debris on the Site, the responsible staff directing the excavation project, and/or the excavation contractor, should notify the Soulard Second Street, LLC Director of Environmental Risk. The address and phone number for the appropriate facility contact is provided below.

##### **Soulard Second Street, LLC Contact:**

Ms. Margaret Knowlton  
Director, Environmental Risk  
Soulard Second Street, LLC  
10350 Bren Road West  
Minnetonka, MN 55343  
Office Phone: 952.656.4683  
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##### **Environmental Consultant:**

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##### **Project Manager:**

Mr. Mark Winschel  
Director, Project Management  
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112 S Hanley Rd., Floor 1 Suite 100  
St. Louis, MO 63105  
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Mobile Phone: 314.707.9653

##### **MDNR:**

Christine Kump-Mitchell  
Missouri Department of Natural Resources  
Hazardous Waste Program  
P.O. Box 176  
Jefferson City, MO 65102-0176  
Office Phone: 314.416.2464  
E-mail: christine.kump@dnr.mo.gov

## SECTION 2

### EXCAVATION SAFETY PROCEDURES

General safety practices should be used by all workers when working within the Site boundaries. This Plan does not supersede the safety requirements set forth in the Occupational Safety and Health Administration's (OSHA's) Safety and Health Regulations for Construction (29 Code of Federal Regulations [CFR] Part 1926) (USEPA, 2018C), specifically Subpart P – Excavations, hazardous waste operation regulations (29 CFR 1910.120) (USEPA, 2018D), safety and health regulations for construction (29 CFR 1926), state and local regulations, applicable Missouri Department of Natural Resources (MDNR) and USEPA guidance, and site-specific health and safety plans. Site personnel or contractors completing excavation work should adhere to OSHA requirements and their own health and safety plan developed specifically for the project scope and in accordance with their health and safety program.

#### **2.1 General Safety Protocols**

As general guidance, when conducting excavation activities workers should focus attention on actions that reduce the likelihood of soil ingestion, inhalation, and dermal exposure. Additionally, activities should minimize uncontrolled transport of soil away from the excavation area. Workers should adhere to the following general protocols:

1. Smoking, eating, drinking, chewing gum, etc., in the work area should be avoided. Hand-to-mouth activity increases the potential for ingestion of constituents present in the soil.
2. Hands and faces should be washed before eating, drinking, or smoking to minimize the potential to ingest constituents present in the soil.
3. Avoid skin contact with the soil by wearing appropriate personal protective equipment (PPE) (see section 2.2). Wash any soiled exposed areas with soap and water.
4. Avoid generating and breathing visible airborne dust during construction activities. Wetting the soil surface is an acceptable method of minimizing dust generation and dust masks may be worn by workers.
5. Be observant of discolored or odorous soil. If soil is emitting odor, additional health and safety procedures may be required to address air quality monitoring and worker safety.

6. Avoid inadvertently carrying soil away from the excavation area to other on-site or off-site areas. Ensure that boots, tools, excavation equipment, and trucks are clean prior to leaving the excavation area.
7. Secure excavations at the end of the day or any time the excavation is left unattended with fencing and signage to disallow access by unauthorized persons. Excavations should be backfilled as soon as possible.

## **2.2 Personal Protective Equipment**

Workers should wear personal protective equipment (PPE) required by their own health and safety plan and best practices. The following additional PPE should be worn to protect workers from COIs that may be present in soil:

1. Chemical resistant gloves – Gloves are meant to prevent dermal contact with soil and may be worn beneath work gloves. Acceptable glove materials include latex, nitrile, polyvinyl chloride (PVC), and rubber. These gloves may be worn beneath work gloves that may be required by other health and safety protocols.
2. Safety glasses/goggles – Glasses or goggles should be used to minimize soil particles contacting the eyes.
3. Disposable chemical resistant coveralls – If worker physical contact with soil is expected, disposable coveralls (i.e. Tyvek suits) should be worn to prevent dermal contact and keep personnel from transporting soil off-site on clothing.
4. Dust masks – Control measures should be used to eliminate dust; however, if there is the potential for dust generation, workers should wear dust masks to prevent inhalation of potentially impacted soil.



## SECTION 3

### SOIL MANAGEMENT

This Soil Management Plan will be implemented for the initial development of the proposed industrial warehouse and shall be utilized for any subsequent excavation work. Soil management planning will include arrangements for staging, characterization, and disposal, as described below. Soil management is required for any soil, foundation materials, and buried materials that are excavated on Site. Soil management is required whether soil is planned to be returned to the excavation or removed off site. Excavated soil, foundation materials, and debris will either be: 1) properly managed onsite, 2) managed on a different property of the John F. Queeny Plant properties covered under the same Environmental Covenant, and/or 3) disposed of offsite dependent on the contaminant levels and regulatory requirements. Soil and foundation materials are expected to be returned to the excavation that they are removed from. If soil and/or foundation materials are to be used offsite on a different property of the John F. Queeny Plant properties covered under the same Environmental Covenant, alternative sampling and acceptance criteria are applicable if the soils and foundation materials come from the PCB engineered barrier areas. This assessment will be managed by the Environmental Consultant.

#### **3.1    Soil Staging**

Soil from the same excavation may be staged as a single pile or direct loaded to be hauled off site. Soil from the PCB engineered barrier areas will be staged together and soils from other areas will be staged separately. Excavated soil should be handled in accordance with the following general protocols:

1. The soil pile should be away from areas where routine facility operation would put workers in contact with soil. Furthermore, soil should not be staged near surface water features such as storm drains or other water conveyance features.
2. When possible, soil should be containerized. For smaller volumes soil may be staged in steel drums or roll-off containers. Larger volumes should be staged on plastic sheeting.
3. If feasible soil should be covered with tarps or plastic sheeting to prevent exposure to precipitation and wind.
4. Soil should not be transported off-site for the purposes of staging except by a certified contractor as described in Section 4.3.

### **3.2 Foundation Materials**

Foundation materials may be found on site that were not previously anticipated. Foundation materials may either be hauled offsite for disposal or may be crushed and reused at one of the other properties apart of the J.F. Queeny Plant. Foundation materials may be staged as a single pile or direct loaded to be hauled off site. Foundation materials from separate areas excavated in the same construction activity may be staged together if the Environmental Consultant has determined they are likely impacted by the same COIs. In all other instances, foundation materials from separate excavations should be staged separately. Excavated foundation materials should be handled in accordance with the following general protocols:

1. Foundation materials should be away from areas where routine facility operation would put workers in contact with the foundation materials. Furthermore, foundation materials should not be staged near surface water features such as storm drains or other water conveyance features.
2. If feasible, foundation materials should be covered with tarps or plastic sheeting to prevent exposure to precipitation and wind.
3. Foundation materials should not be transported off-site for the purposes of staging except by a certified contractor as described in Section 4.3.

### **3.3 Management of Unexpected Subsurface Conditions**

Unexpected conditions may occur during excavation activities. When an unexpected condition occurs, soil-disturbing activities in the immediate area of the discovery shall immediately cease upon the discovery of unexpected subsurface conditions including the following:

1. Drums, underground storage tanks, piping, sumps, etc.
2. Suspect regulated materials (e.g. suspect asbestos containing debris)
3. Significant uncharted utilities or subsurface obstructions/features

Notify the Environmental Consultant and MDNR immediately of the encounter of unexpected subsurface conditions.

### **3.4 Surface Water Management**

During construction activities where impacted soil is exposed, the Contractor should take care of preventing surface water accumulation on or around the impacted soil. Construction activities shall be sequenced to limit the amount of impacted soil exposed at one time and berms shall be constructed around excavation areas to prevent surface water from flowing over impacted soil.

## SECTION 4

### INSPECTION, SAMPLING, AND CHARACTERIZATION

Inspection and sampling should be conducted for characterization for offsite reuse and disposal by the Environmental Consultant. Soils, foundation materials, and debris that are to be reused offsite shall meet all regulatory requirements. If soils, foundation materials, and debris are slated for offsite disposal, the Environmental Consultant shall confirm with the disposal facility on its own requirements for characterization for acceptance, and the facility will be consulted prior to sampling.

#### 4.1 Analytical Data Requirements

For offsite reuse sampling, if disposal sampling is time-sensitive and the disposal facility cannot be contacted, at a minimum the following parameters will be analyzed:

- Target Analyte List (TAL) Metals
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Paint Filter test
- Closed Cup Flashpoint
- Toxicity Characteristic Leaching Procedure (TCLP) Metals
- TCLP Volatile Organic Compounds (VOCs)
- TCLP Semivolatile Organic Compounds (SVOCs)
- Aroclor Polychlorinated Biphenyls (PCBs)
- Extractable Organic Halides (EOX)
- pH
- Total Cyanide
- Reactive Sulfide
- Total Phenols

#### 4.2 Representative Sample Collection

General guidance for development of a sampling strategy will be in general conformance with ASTM Standard D6009-12. Samples will be representative of all staged soil and therefore should be composite samples. Composite samples will include both surface grabs and soil collected across the entire depth profile using a hand auger or shovel that are mixed until visually homogeneous. The number of samples collected from staged soil is at the discretion of the disposal site and Environmental Consultant.

As a general guideline, multiple representative samples will only be collected if staged soil may be reasonably segregated for disposal should sampling indicate different disposal classifications and handling are required. The number of samples will depend on the volume of soil generated or the overall area of the excavation, heterogeneity of soil, evidence of COIs, and soil source.

- Volume/Area – This Plan does not provide a sample per unit volume of soil criteria for characterization. If staged soil is homogenous and cannot be segregated by other methods, as few samples as possible will be collected. Multiple samples will be collected if, to spatially characterize the soil pile, numerous aliquots (greater than five) are required and effective homogenization of aliquots is unreasonable.
- Heterogeneity – If staged soil displays distinctly different characteristics (e.g. a portion of the excavated area consisted of urban fill material and a portion consisted of native soil), distinctly different material may be characterized by individual samples.
- Evidence of COIs – Material that was segregated due to evidence of COIs (e.g. staining and/or odor) will be sampled independent of other staged waste soil.
- Soil Source – Soil that was generated from two separate areas will be characterized independently.
- All samples will be placed immediately on ice and shipped to the selected certified laboratory for the required analysis under proper chain-of-custody procedures.

#### **4.2.1 Representative Foundation Materials Inspection and Sample Collection**

Foundation materials that are removed to allow for future site development will be inspected and documented upon discovery. Foundation materials will be handled based upon their location relative to PCB-impacted soils. There are two different methods for managing foundation materials on site, which are further defined below.

##### ***4.2.1.1 Foundation Materials in PCB-Impacted Soil Areas***

For foundation materials found in the areas of PCB-impacted soils (**Figure 3**), the development of a sampling strategy will be in general conformance with 40 CFR 761. The following is the procedure for sampling foundation materials in PCB-impacted soil areas:

- Foundation materials that are able to be sampled in situ will be sampled in a grid pattern at sampling points approximately 4.5 feet apart in general accordance with 40 CFR 761.283.
  - For foundation materials that are not able to be sampled in situ, stock piles will be created by the contractor. Prior to removing the foundation material from in situ, the contractor will document approximate depth, length, and width of the foundation material. The Environmental Consultant will use that information to determine the appropriate number of samples as if the foundation was sampled in a grid pattern at sampling points approximately 4.5 feet apart in general accordance with 40 CFR 761.283.

- Bulk samples will be collected in general accordance with 40 CFR 761.286 using a hammer drill equipped with a 1-inch diameter masonry bit (approximately 3-inch deep “cores” drilled at each concrete bulk sample location). Bulk samples from four adjacent grid locations will be composited into 1 composite sample.
  - If foundation materials are sampled ex situ, bulk samples will be collected in general accordance with 40 CFR 761.286 using a hammer drill equipped with a 1-inch diameter masonry bit (approximately 3-inch deep “cores” drilled at each concrete bulk sample location). If the foundation material is not able to be sampled using a hammer drill equipped with a 1-inch diameter masonry bit to depth of approximately 3 inches, a chisel may be used to generate the bulk sample.
- Duplicate composite samples will be collected on a frequency of 1 per 10 samples.
- One hexane blank sample will be submitted for each sampling event.
- Concrete composite samples will be placed in laboratory-supplied containers and in a cooler with ice for submittal to the laboratory.

Based on the sampling results, below are the possible scenarios for foundation materials in PCB-impacted soil areas:

- All samples of the specific foundation materials that come back as non-detect and up to 10 ppm are approved per the Environmental Covenant (USEPA, 2018B) to be used offsite on a different property of the John F. Queeny Plant properties covered under the same Environmental Covenant. These foundation materials will be crushed and used as fill.
- Any samples of the specific foundation materials that come back between 10 ppm to 100 ppm will be crushed and used as fill in the area of the engineered cap or may be hauled to an approved solid waste disposal facility based upon the facility’s approval requirements.
- Any samples per the specific foundation materials that come back above 100 ppm are to be hauled to an approved solid waste disposal facility based upon the facility’s approval requirements.

#### ***4.2.1.2 Foundation Materials in Non-PCB-Impacted Soil Areas***

For foundation materials found in the areas of non-PCB-impacted soils (**Figure 3**), the foundation materials will be inspected for staining and odors. In the event there are staining or odors, the foundation materials will be sampled per the previous section for the potential of PCBs. If there are no stains or odors, the foundation materials will be cleaned to remove any loose soil or soil

clods and the foundation materials will be allowed to be crushed and used as fill at another parcel of the J.F. Queeny Plant.

#### **4.3 Soil, Foundation Materials, and Surface Water Disposal**

Disposal of soil, foundation materials, and surface water will be coordinated with the Environmental Consultant. Disposal, including manifesting, loading, and transportation will be conducted by a Hazardous Waste Operations and Emergency Management (HAZWOPER)-trained and certified contractor. The transporter selected to deliver the material to the disposal site and the disposal site will have the required permits and authorization to transport and dispose of soil or surface water with the analytes identified in the analytical sampling results. The Environmental Consultant designee or a designee of the property owner will oversee soil and surface water loading and verify and sign waste manifests.

Soil, foundation materials, and buried materials that meet regulatory requirements for reuse may be used on site or sent off site for reuse in accordance with applicable regulatory requirements as determined by the Environmental Consultant.

## **SECTION 5**

### **IMPORTING OF SOIL**

This Plan must be followed when importing soil for construction work. Soil management planning will include arrangements for pre-approval, importing, and staging, as described below. Soil management is required for any soil that is imported to the Site. Imported soil will be properly vetted prior to being imported. This assessment will be coordinated through the Environmental Consultant.

#### **5.1 Pre-Approval**

Sampling will be conducted for characterization to ensure the soil meets the Missouri Risk-Based Corrective Action Technical Guidance standards for a non-residential site. Soil that does not meet the prescribed non-residential standards will not be imported to the site. If soil is being imported from an undisturbed property (i.e., virgin source) that has not had any previously known commercial and/or industrial operations on the property, and this can be adequately documented, the Environmental Consultant may approve the soil without sampling the soil.

#### **5.2 Analytical Data Requirements**

At a minimum the following parameters will be analyzed for any imported soil:

- Polycyclic Aromatic Hydrocarbons (PAHs)
- Metals
- Volatile Organic Compounds (VOCs)
- Semivolatile Organic Compounds (SVOCs)
- Aroclor Polychlorinated Biphenyls (PCBs)

#### **5.3 Representative Sample Collection**

General guidance for development of a sampling strategy will be in general conformance with ASTM Standard D6009-12. Samples will be representative of all staged soil that is to be imported and therefore should be composite samples. Composite samples will include both surface grabs and soil collected across the entire depth profile using a hand auger or shovel that are mixed until visually homogeneous. The number of samples collected from staged soil is at the discretion of the Environmental Consultant.

As a general guideline, multiple representative samples will only be collected if staged soil may be reasonably segregated. The number of samples will depend on the volume of soil generated or the overall area of the excavation, heterogeneity of soil, evidence of COIs, and soil source.

- Volume/Area – This Plan does not provide a sample per unit volume of soil criteria for characterization. If staged soil is homogenous and cannot be segregated by other methods, as few samples as possible will be collected. Multiple samples will be collected if, to spatially characterize the soil pile, numerous aliquots (greater than five) are required and effective homogenization of aliquots is unreasonable.
- Heterogeneity – If staged soil displays distinctly different characteristics (e.g. a portion of the excavated area consisted of urban fill material and a portion consisted of native soil), distinctly different material may be characterized by individual samples.
- Evidence of COIs – Material that was segregated due to evidence of COIs (e.g. staining and/or odor) will be sampled independent of other staged waste soil.
- Soil Source – Soil that was generated from two separate areas will be characterized independently.
- All samples will be placed immediately on ice and shipped to the selected certified laboratory for the required analysis under proper chain-of-custody procedures.



## **SECTION 6**

### **REFERENCES**

ASTM. 2012. Designation D6009-12. Standard Guide for Sampling Waste Piles. ASTM International. West Conshohocken, PA. 2012.

USEPA. 2018A. SHW Investments II, LLC c/o Environmental Operations, St. Louis, Missouri, Environmental Covenant.

USEPA. 2018B. Former Solutia, J.F. Queeny Facility, St. Louis, Missouri, Statement of Basis

USEPA. 2018C. 29 Code of Federal Regulations 1926 Subpart P – Excavations

USEPA. 2018D. 29 Code of Federal Regulations 1910.120 Hazardous Waste Operations and Emergency Response

## FIGURES

## FIGURE 1



VICINITY MAP



PROPERTY LOCATION MAP



REGIONAL MAP

**SOULARD INDUSTRIAL  
DEVELOPMENT WAREHOUSE**  
201 RUSSELL BOULEVARD  
ST. LOUIS, MISSOURI

GENERAL LOCATION MAP

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consultants

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FIGURE

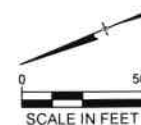
1

## FIGURE 2



**REFERENCE:**

- AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO. 2018



**SOULARD INDUSTRIAL  
DEVELOPMENT WAREHOUSE**  
201 RUSSELL BOULEVARD  
ST. LOUIS, MISSOURI

PROJECT SITE MAP

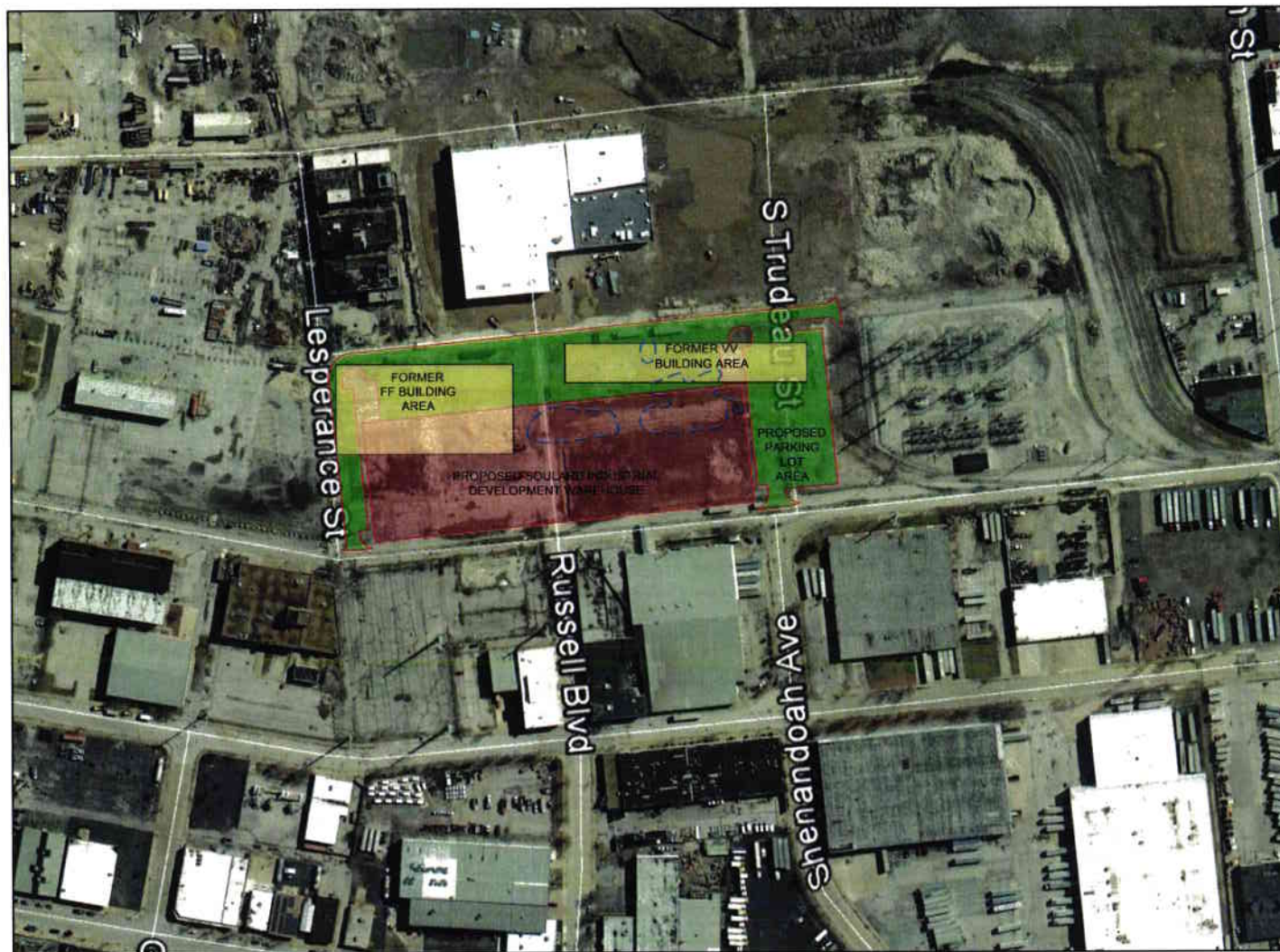
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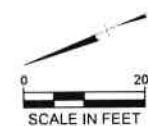
FIGURE  
2

## FIGURE 3





- LEGEND:**
- PROPOSED SOULARD INDUSTRIAL DEVELOPMENT WAREHOUSE
  - PROPOSED PARKING LOT AREA
  - FORMER BUILDING LOCATIONS
  - ENGINEERED BARRIER FOR PCB-IMPACTED SOILS



**SOULARD INDUSTRIAL  
DEVELOPMENT WAREHOUSE**  
201 RUSSELL BOULEVARD  
ST. LOUIS, MISSOURI

PCB CAP LOCATIONS

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FIGURE  
3

**REFERENCE:**  
- AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO, 2018.